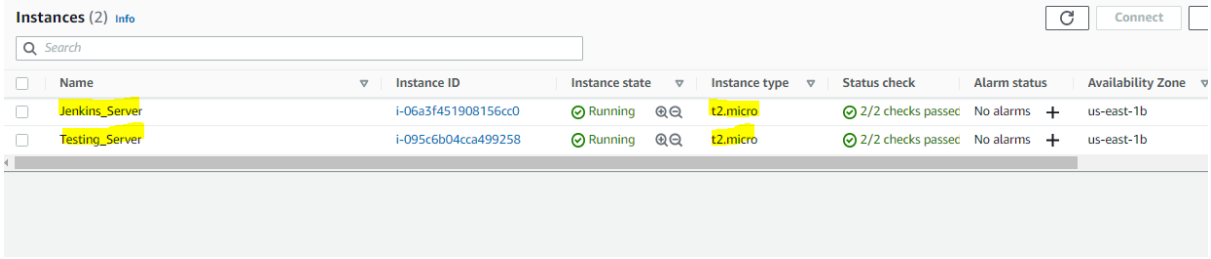
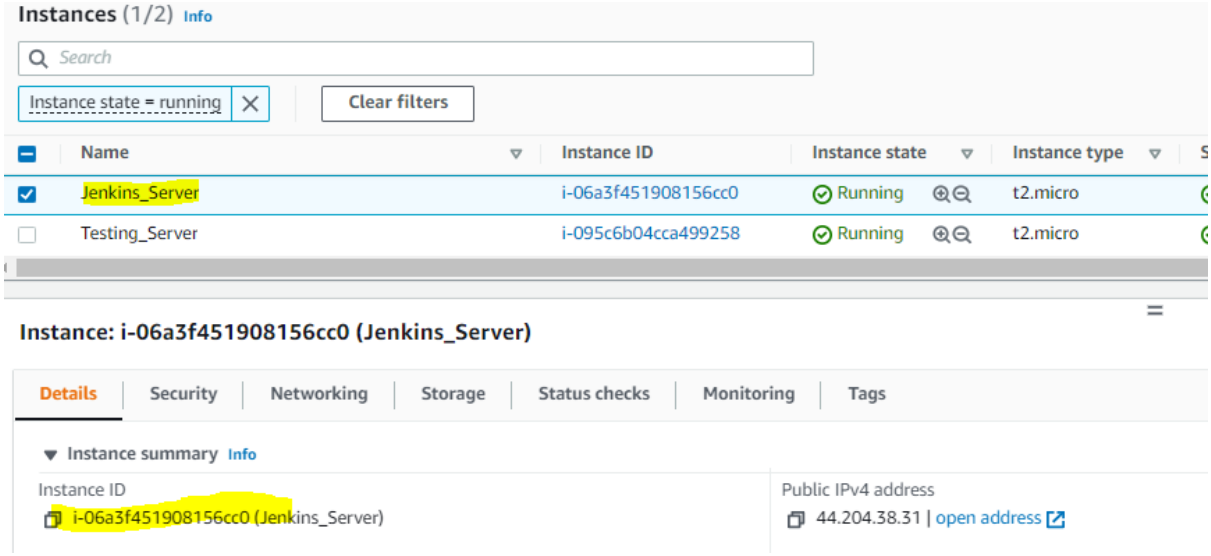
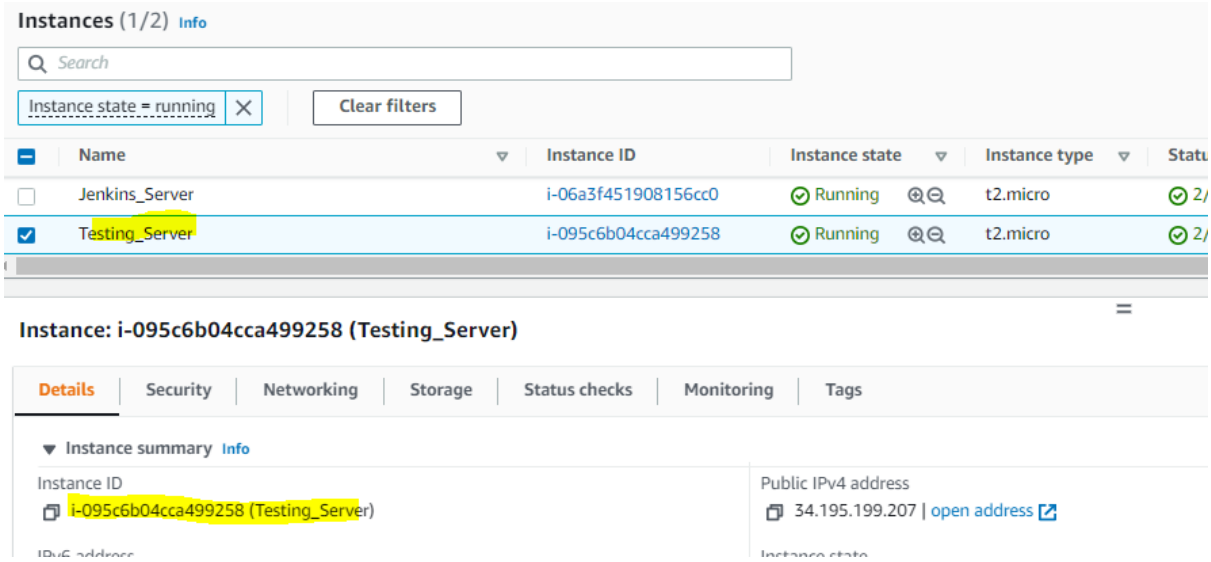
**Requirement:**

```
## Create a Jenkins Job that will take two inputs:
  1) Instance Id
  2) Instance Type

## The Jenkins Job should perform 3 operations:
  1) Change the instance type of instance with the provided instance type.
  2) Perform an operation using ansible on the provided instance
  3) Scale back instance to the previous instance type.
```

- Launch an ec2 instance for Jenkins_server and testing_server – for testing_server I've associated ElasticIP





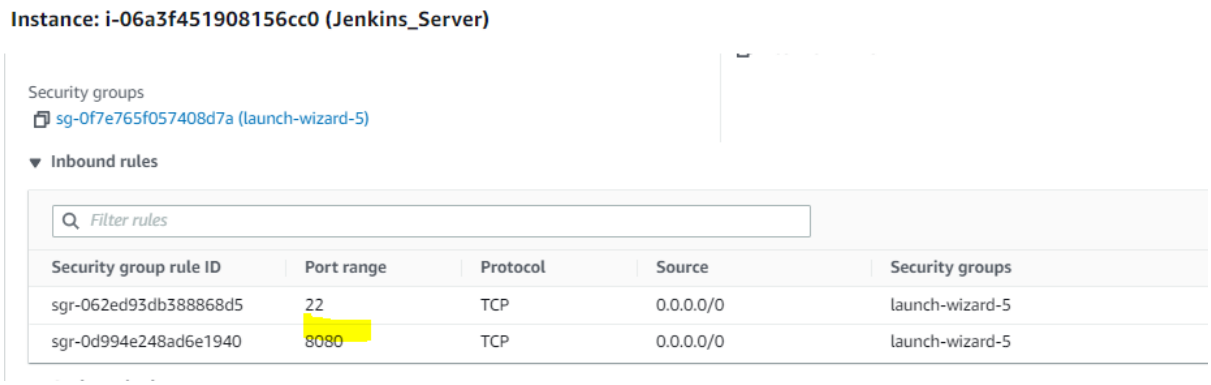

- Login to Jenkins_server machine and install pre-requisites for Jenkins

```
sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo
sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key
```

I've launched an ec2 instance of type amazon linux so installed jdk from amazon-linux-extras

1. amazon-linux-extras list
2. amazon-linux-extras install java-openjdk11 -y
3. yum install jenkins -y
4. service jenkins status
5. service jenkins start
6. service jenkins status
7. netstat -tupln
8. chkconfig jenkins on
9. cat /var/lib/jenkins/secrets/initialAdminPassword

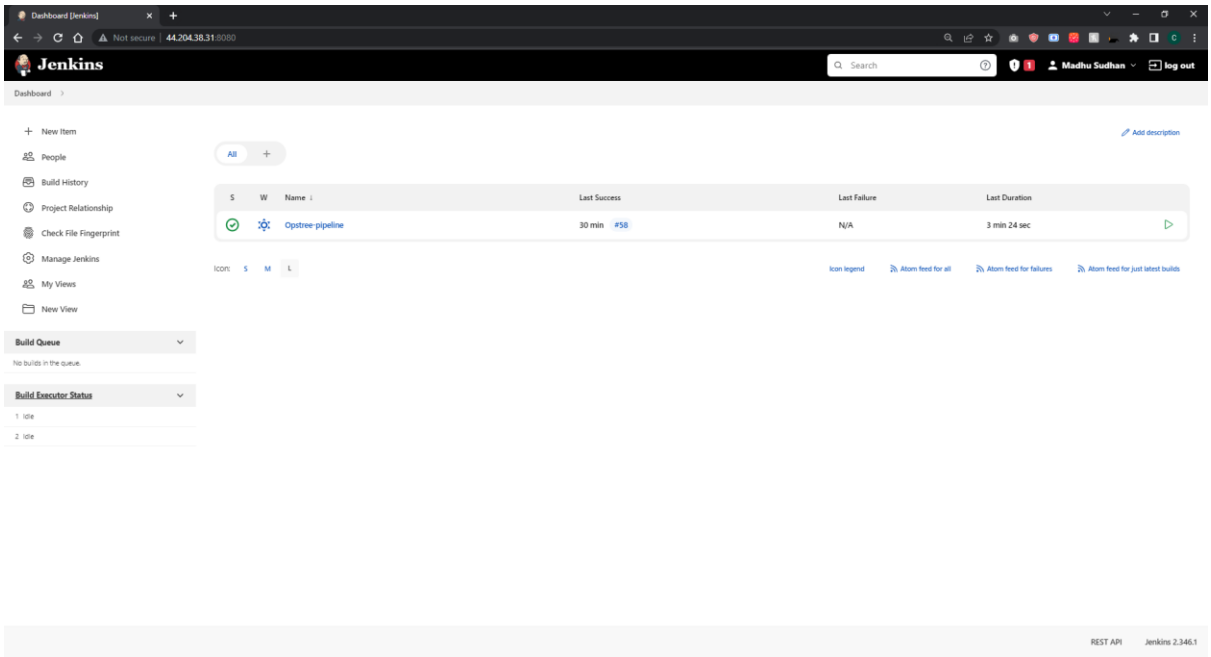
Access Jenkins GUI by allowing port 8080 in the security group (Source I've given as 0.0.0.0/0 for demonstration purpose)




Install the plugins suggested by Jenkins when the setup is done for the first type

Create a user name and password and then log in

Created a Pipeline project called - [Opstree-pipeline]




For two inputs – Instance_Id and Instance_Type, I've given them as parameterized inputs in Jenkins


As this is a pipeline project, We need git to pull the code from the remote repository

For credentials – I've configured username and password as global credentials

## Credentials

| T | P | Store ↓ | Domain | ID | Name |
|---|---|---|---|---|---|
| | | Jenkins | (global) | Github_creds | madhusudhan7492/****** (Github credentials) |

**Pipeline**

Definition

Pipeline script from SCM

SCM ?

Git

Repositories ?

Repository URL ?

https://github.com/madhusudhan7492/Opstree-task.git

Credentials ?

madhusudhan7492/****** (Github credentials)

+ Add

Advanced...

Add Repository

Branches to build ?

Branches to build ?

Branch Specifier (blank for 'any') ?

*/master

Add Branch

Repository browser ?

(Auto)

Additional Behaviours

Add

Script Path ?

Jenkinsfile

As Jenkins has to run aws CLI commands so configured aws-keys in global credentials

## Credentials

| T | P | Store ↓ | Domain | ID | Name |
|---|---|---|---|---|---|
| | | Jenkins | (global) | Github_creds | madhusudhan7492/****** (Github credentials) |
| | | Jenkins | (global) | aws-key | AKIASOZV( /****** (aws_access_key_id and password) |

Below is the Jenkins file: [https://github.com/madhusudhan7492/Opstree-task/blob/master/Jenkinsfile](https://github.com/madhusudhan7492/Opstree-task/blob/master/Jenkinsfile)

1. Checkout SCM – clone the given repo in Jenkins workspace and use Github_creds which were configured as global credentials
2. Describe the instance and stop it – how many instances are there in the account and then stop the instance_id which was given as input
3. Change the instance_type which was given as input
4. Start the instance
5. Run the ansible-playbook (for ansible I've created ansadmin user in jenkins_server and testing_server then created and copied ssh public key from ansadmin user in jenkins_server and pasted it in testing_server
    a. In jenkins_server
    b. Install ansible from amazon-linux-extras in Jenkins_server
        i. useradd ansadmin
        ii. passwd ansadmin
        iii. su – ansadmin
        iv. ssh-keygen -t rsa
        v. Copied id_rsa.pub (public key) and paste in target node (testing_server)
    c. In testing_server
        i. useradd ansadmin
        ii. passwd ansadmin
        iii. su – ansadmin
        iv. mkdir .ssh
        v. cd .ssh
        vi. vi authorized_keys
        vii. Paste the copied public key
        viii. Change the permission of .ssh folder and authorized_keys file
        ix. chmod 700 .ssh (read, write and execute permission for ansadmin)
        x. chmod 600 authorized_keys (read and write permission for ansadmin)
    d. In jenkins_server (control node) and testing_server (target node) to check the connectivity
        i. ssh ansadmin@TargetnodeIP
    e. In jenkins_server and testing_server we need to give sudo root access to ansadmin so adding to wheel group
    f. Visudo from the root and uncomment - %wheel ALL=(ALL) NOPASSWD: ALL
        i. usermod -a -G wheel ansadmin (adding secondary group as the wheel)
    g. Also given ansadmin username and password as global credentials
    h. In ansible playbook, I've written a task to install httpd and start the service in main.yaml in the dev host group (I've given testing_server IP in /etc/ansible/hosts file)

**Credentials**

| T | P | Store ↓ | Domain | ID | Name |
|---|---|---|---|---|---|
| | | Jenkins | (global) | Github_creds | madhusudhan7492/****** (Github credentials) |
| | | Jenkins | (global) | aws-key | AKIASOZVOLNMTT7PODVH/****** (aws_access_key_id and password |
| | | Jenkins | (global) | ansadmin | ansadmin |

6. Once the ansible-playbook has run, next step is to stop the instance and flip to the previous instance type (here I've considered an env variable as OLD_INSTANCE_TYPE as "t2.micro")
7. For describe-instances, start instance, stop instance, modify instance type – I've configured AWS Access key and AWS Secret key as global credentials and imported @Library('github.com/releaseworks/jenkinslib') _ - This will load the Releaseworks Jenkins library, that includes the helper function that we will use. And then used withCredentials to get the aws-key and executed commands on specified region and also to execute from jenkins user installed docker and added jenkins user to docker.sock and changed permission to docker.sock file - chmod 777 /var/run/docker.sock
8. As part of the plugins i've installed Ansible plugin and given the location of ansible /usr/bin/ in the Global Tool configuration
9. Link to latest build output - http://44.204.38.31:8080/job/Opstree-pipeline/58/consoleText

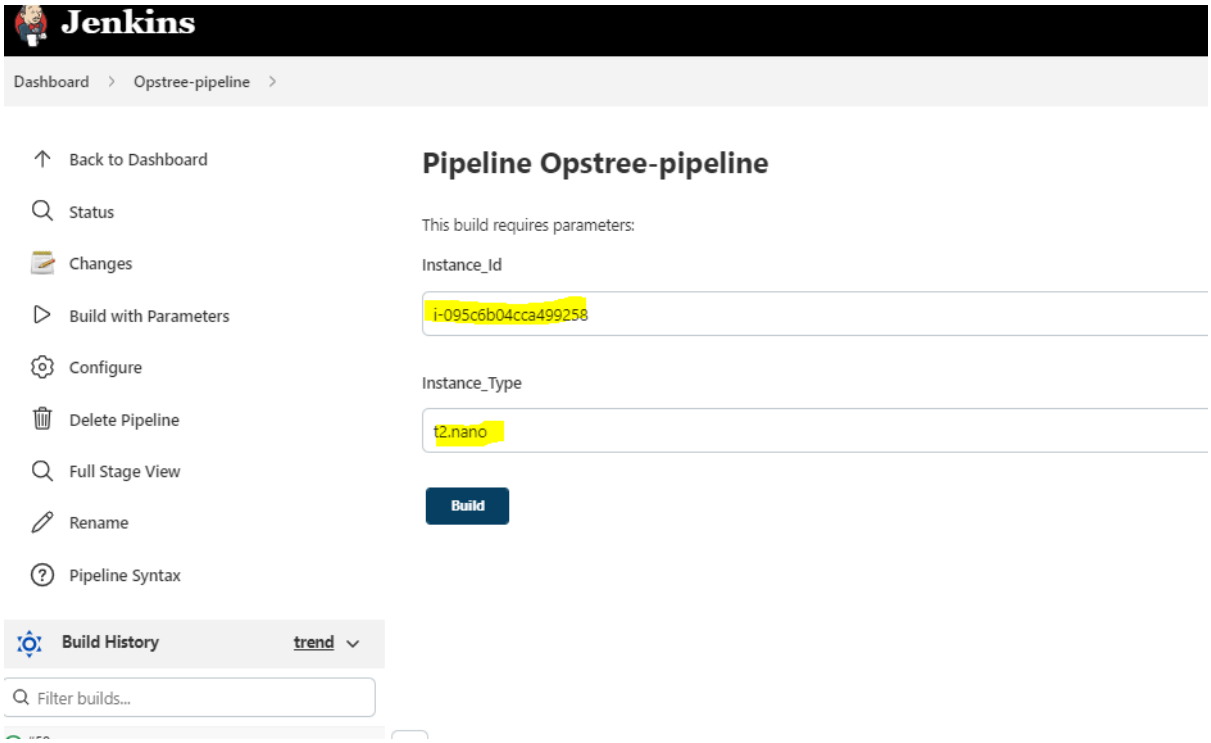
```
@Library('github.com/releaseworks/jenkinslib') _
pipeline {
  agent any

  environment {
        OLD_INSTANCE_TYPE = 't2.micro'
    }

  stages {
    // Clone the github repo on jenkins workspace
    stage('Checkout SCM') {
      steps {
        checkout([$class: 'GitSCM', branches: [
          [name: '*/master']
        ], doGenerateSubmoduleConfigurations: false, extensions: [], submoduleCfg: [], userRemoteConfigs: [
          [credentialsId: 'Github_creds', url: 'https://github.com/madhusudhan7492/Opstree-task.git']
        ]])
      }
    }

    //Describe the instance status and stop the instance
    stage("Describe and stop the instance") {
      steps {
        withCredentials([
          [$class: 'UsernamePasswordMultiBinding', credentialsId: 'aws-key', usernameVariable: 'AWS_ACCESS_KEY_ID', passwordVariable: 'AWS_SECRET_ACCESS_KEY']
        ]) {
          AWS("--region=us-east-1 ec2 describe-instances --query 'Reservations[*].Instances[*].{PublicIP:PublicIpAddress,Name:Tags[?Key=='Name']|[0].Value,Status:State.Name,Insta
          AWS("--region=us-east-1 ec2 stop-instances --instance-ids $Instance_Id")
        }
        sh "echo 'Wait for 25 seconds to let the instance turn into stop state'"
        sh "sleep 25"

      }
    }
```

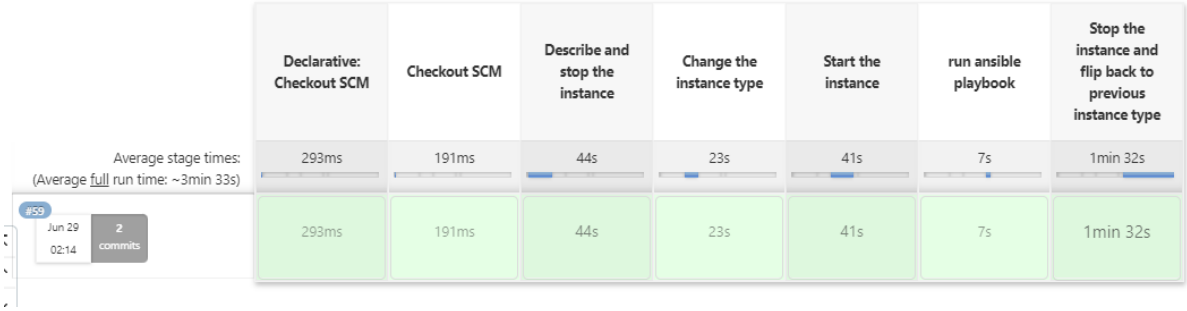
```
//change the instance type as per the input parameter given before running the job
stage("Change the instance type") {
  steps {
    withCredentials([
      [$class: 'UsernamePasswordMultiBinding', credentialsId: 'aws-key', usernameVariable: 'AWS_ACCESS_KEY_ID', passwordVariable: 'AWS_SECRET_ACCESS_KEY']
    ]) {
      AWS("--region=us-east-1 ec2 describe-instances --instance-ids $Instance_Id --query 'Reservations[*].Instances[*].{PublicIP: PublicIpAddress, Name:Tags[?Key== 'Name']|[0
      AWS("--region=us-east-1 ec2 modify-instance-attribute --instance-id $Instance_Id --instance-type '{\"Value\": \"$Instance_Type\"}'")
      AWS("--region=us-east-1 ec2 describe-instances --instance-ids $Instance_Id --query 'Reservations[*].Instances[*].{PublicIP: PublicIpAddress, Name:Tags[?Key== 'Name']|[0
    }
  }
}

//Start the instance (testing_server)
stage("Start the instance") {
    steps {
    withCredentials([
      [$class: 'UsernamePasswordMultiBinding', credentialsId: 'aws-key', usernameVariable: 'AWS_ACCESS_KEY_ID', passwordVariable: 'AWS_SECRET_ACCESS_KEY']
    ]) {
      AWS("--region=us-east-1 ec2 start-instances --instance-ids $Instance_Id")
      sh "sleep 25"
      AWS("--region=us-east-1 ec2 describe-instances --instance-ids $Instance_Id --query 'Reservations[*].Instances[*].{PublicIP: PublicIpAddress, Name:Tags[?Key== 'Name']|[0
    }

  }
}
//Run ansible playbook on the testing_server
stage('run ansible playbook') {
  steps {
    //here main.yml file is in the cloned repository
    ansiblePlaybook credentialsId: 'ansadmin', disableHostKeyChecking: true, installation: 'ansible', playbook: 'main.yml'
  }
}
```

```
    stage("Stop the instance and flip back to previous instance type") {
      steps {
        withCredentials([
          [$class: 'UsernamePasswordMultiBinding', credentialsId: 'aws-key', usernameVariable: 'AWS_ACCESS_KEY_ID', passwordVariable: 'AWS_SECRET_ACCESS_KEY']
        ]) {
          AWS("--region=us-east-1 ec2 stop-instances --instance-ids $Instance_Id")
          sh "sleep 25"
          AWS("--region=us-east-1 ec2 describe-instances --instance-ids $Instance_Id --query 'Reservations[*].Instances[*].{PublicIP: PublicIpAddress, Name:Tags[?Key== 'Name']|[0
          AWS("--region=us-east-1 ec2 modify-instance-attribute --instance-id $Instance_Id --instance-type '{\"Value\": \"${OLD_INSTANCE_TYPE}\"}'")
          AWS("--region=us-east-1 ec2 start-instances --instance-ids $Instance_Id")
          sh "sleep 25"
          AWS("--region=us-east-1 ec2 describe-instances --instance-ids $Instance_Id --query 'Reservations[*].Instances[*].{PublicIP: PublicIpAddress, Name:Tags[?Key== 'Name']|[0
        }
      }
    }

  }
}
```

**Demo:**

1. Build with the below parameters




**Build output:** BUILD_OUTPUT.txt

**Further improvements:**

1. Instead of one playbook, writing ansible roles

2. Instead of one instance id, writing for loop and using aws describe_instances method to get all the instance_ids for that region and change the instance_type and invoke then Ansible role to them
3. We can also take region as an input parameter and invoke that in Jenkinsfile
4. In Jenkinsfile I've hardcoded the OLD_INSTANCE_TYPE, which can be further improved by running aws describe_instances and getting the instance type and storing it in some variable, and then calling it while flipping back